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An Evidence-Based Policy for Managing Global Health Access Through Medical Travel

Kai Ruggeri^{1*}, Nevena Ivanovic², Josip Razum³, Ondřej Kácha⁴, Igor G. Menezes⁵, Zafar Zafari⁶, Eduardo Garcia-Garzon⁷

1 – Policy Research Group, Department of Psychology, University of Cambridge, United Kingdom

2 – Faculty of Philosophy, University of Belgrade, Serbia

3 – Faculty of Humanities and Social Sciences, University of Zagreb, Croatia

4 – Policy Research Group, Department of Psychology, University of Cambridge, United Kingdom

5 – Quantitative Methods and Predictive Psychometrics, Institute of Psychology, Federal University of Bahia, Salvador, Brasil.

6 – Mailman School of Public Health, Columbia University, New York, USA

7 – Social Psychology and Methodology Department, Psychology Faculty, Universidad Autónoma de Madrid, Spain

Corresponding Author: Kai Ruggeri

Department of Psychology, University of Cambridge, Downing Street, Cambridge, CB2 3EB

Email: dar56@cam.ac.uk

Phone: +441223768218

Highlights:

- -Medical travel is expanding rapidly around the world.
- -There is still no overarching framework for policies related to medical travel.
- -Experiment tested preferences considering factors based on existing evidence.
- -Quality of care is the most critical factor in medical travel decision.
- -A comprehensive framework based on all findings and available evidence is proposed.

Abstract

Global medical travel has had an increasing trend without a comprehensive, evidence-driven policy to ensure safe and effective practice. To identify key factors that influence medical travel, a series of studies culminating with a preference and decision-making component of over 500 prospective medical travelers from a number of countries. Results indicated that quality of care was the most critical factor in the decision, followed by lower costs of procedure and shorter

waiting times. Lower costs were less of a factor if the procedure was more invasive, which also increased the importance of waiting time in the decision. The most desired destinations for care were in Europe (United Kingdom, Germany) and North America (United States). Building on these insights and previous literature, we present a model that for implementing applications from these factors and additional insights generated across the series of studies toward an effective policy framework.

Keywords: medical travel, global health policy, medical tourism, health economics, evidence-based policy

1. Introduction

1.1 Current State of Medical Travel Policy

Medical travel is the selective movement of patients beyond national borders to pursue medical treatment [1], representing a steadily growing sector in the global healthcare market. Strictly speaking, the specific concept of medical travel includes any treatment or procedure that a health professional deems necessary for maintaining patient quality of life. Using this framework, as opposed to medical tourism or simply receiving unplanned care while abroad, medical travel does not encompass emergency or life-threatening conditions, controversial treatment or medical tourism, where patients travel for non-urgent purposes that are of arguable necessity (e.g. cosmetic surgery, [2]).

The magnitude at which individuals travel specifically for the purposes of urgent care is hard to accurately determine [3]. Estimates indicate that there are millions of medical travelers worldwide [2], with a market value of billions of U.S. dollars [4], where hospitals in at least thirty different countries are actively promoting the enterprise [5] in a highly unregulated market. A more

systematic attempt at regulating medical travel was carried out in EU, where the Directive 2011/24/EU on the application of patients' rights in cross-border healthcare was created by the European Parliament and Council [6] and implemented by member states [7]. The Directive defines conditions under which a patient may travel to another EU country for medical services and receive reimbursement, and it obliges the member states to provide the patient with all the necessary information via national contact points. However, it lacks sufficient binding mechanisms regulating the cross-border sharing of patient records, as well as ensuring a safe process, and a quality transition to follow-up care.

1.2 Challenges in medical travel

Research on medical tourism, which includes travel for cosmetic and non-urgent care, has mentioned this lack of regulation [8], yet few papers until recently have outlined specific needs for establishing guidelines specifically focused on medical travel. When discussed, important considerations have included: establishing international quality standards [9], economic and legal issues [10], information provided by medical travel agency websites [11], as well as several aspects regarding patient safety through the transfer of medical records, transparency of the care process, and safe choice [12].

Medical travelers often aim to avoid undertaking certain medical procedures in their home country, due to the perception that they are unaffordable or unavailable [3]. As such, they should be considered as conscious consumers [13]. Making clear policy frameworks will thus go a long way in supporting safe and appropriate decisions.

1.3 Factors Influencing Medical Travel Decisions

To manage and regulate this phenomenon better, it is crucial to understand why individuals engage in medical travel. Known factors that may enhance or decrease the willingness of

individuals to travel for medical purposes and include quality of care, costs, and waiting time or the type of medical procedure under consideration [14]. While there have been attempts to model these factors using frameworks for a range of relevant drivers [6], significant interactions between those factors were left unexplored. For example, there is limited understanding about the interdependencies between decision-making factors and perceptions about the location of care [2, 13].

The lack of insight into this decision-making process is problematic and can result in misleading claims from host clinics seeking to appeal to prospective patients. Focusing on the offer of reduced costs or waiting time, some individuals overlook the quality of the service provided [15], resulting in health risks. Medical travelers may also face a potential lack of medical follow up after returning home, even for those countries that do have international care frameworks in place [12].

Considering the evidence available in light of the patterns of behavior as well as challenges presented, a multi-year study covering multiple key aspects of medical travel was carried out by a large team of researchers from a number of countries (predominantly from Europe and North America) [1, 9, 10, 11, 12, 14, 16, 17]. The largest of these studies involved a sophisticated decision-making instrument for assessing likelihood of travel that would have the potential to inform policy through validating the strongest predictions of behavior. The following study presents a comprehensive model of insights from those data, and interprets for potential applications to policy.

2. Methods

2.1 Participants

Prospective medical travelers (n=529; 68% female; mean age 27.6 years, SD=10.4) were recruited for the study by using social media sites. A broad definition of potential medical travelers was used to include any individuals who belong to a non-patient population, or are yet to decide whether they would travel for medical care. Unfortunately, it was not possible to track the entry point used to access the study, but most circulation was carried out on Facebook and LinkedIn. Other sites used included ResearchGate and group mailing lists.

The sample was predominantly European (87.7%) and 74.5% had at least a bachelor-level degree (or equivalent) or above. Sample characteristics are further detailed in a previous publication [14], though some participants considered in prior analyses were excluded in this particular model. Participants gave explicit informed consent prior to their participation. Ethical approval was granted from the Department of Engineering Ethics Committee at the University of Cambridge. Each participant was presented with six random scenarios combining the three domains, yielding a total of 3,174 observations.

2.2 Measurement

The corpus of available evidence regarding medical travel has predominantly involved data from past medical travelers, either studying the conditions under which medical travel occurs (e.g. [12, 2]), or the consequences of the medical processes [13]. Before promoting attempts to implement policies intended for entire populations, it is necessary to examine data regarding the general population (i.e., prospective medical travelers).

To ensure appropriate aspects were included in the measure and in the analyses, a systematic literature search was conducted across PubMed and Europe PubMed Central databases. This built on the existing evidence review published in 2015 [1]. The articles that were considered in the review included the terms “medical travel” or “medical tourism” in their title or abstract, were

written in English, were published between January 1st, 2012 and April 15th, 2018. Articles produced by private firms that required a payment for access were excluded.

The search yielded 253 hits overall, with a final number of 149, after excluding duplicates. Overall, 21 articles mentioned the number of medical travelers in any context (e.g. estimates of the overall number of medical tourists in the world), but only 10 articles included information about the number of medical travelers for specific destination countries. Overall, there were only minor adjustments to be included from the initial review: a slight increase in medical travelers in Turkey using 2011 data [18] and a fourfold increase in medical travelers to the Republic of Korea from 2014 data [19]. General factors of interest were not substantially different in the update review, reaffirming the choice of metrics and interpreted insights presented later.

2.3 Instrument

Existing accounts of patient choices have highlighted the benefits of studying individual behavior by presenting participants with hypothetical scenarios, followed by choosing whether or not to travel. These methods, known as stated preferences, act as reliable proxies for inferring future real behavior [20, 21]. We used a binary discrete choice experiment to capture patients' stated preferences for medical travel [16].

To identify the main drivers of medical travel, a novel instrument based upon different combination of three domains was developed [14]. The domains were 1) invasiveness of procedure (i.e., hip and heart valve replacement); 2) reason for travel (i.e., fewer costs, shorter waiting lists, better quality of care); and 3) country of destination for a proposed medical procedure (namely Australia, Dubai, Germany, United Kingdom, Malta, New Zealand, Philippines, Portugal, Qatar, Singapore, Thailand and the United States of America). Additional individual features were also selected from existing literature [5, 3], encompassing four thematic blocks: sociodemographic

characteristics (i.e., sex, age, education level and income level); previous experience with medical travelling; time spent living abroad, and perception of local healthcare (i.e., own healthcare quality, cost and waiting times). These domains were selected according to literature reviews [1, 14]. Scenarios were constructed in such a way that each participant received six questions that combined procedure and reason levels, randomized by country [14]. This methodology was analogous to previously validated instruments applied in similar contexts [21]. Countries included in the option list were based on a linked literature review [1].

2.4 Statistical framework

A multilevel logistic regression model was built to identify preferences for medical travel. Further justification for the use of such models can be found in the literature [16]. For multilevel logistic regression models, coefficients are relative measures of effect, known as odds ratio. To be considered significant at $\alpha < 0.05$, the confidence intervals must not include the value 1.0 (either both are above or both are below 1.0). First-level variables included observations for individuals, including medical procedure and medical reasons, plus the additional questions regarding individual characteristics. For the second level of the model, observations were clustered around the country of destination. Variable coding and a rationale for the selection of the reference categories can be found in a previous publication [16]. In this case, multilevel modelling corrected the effect of each set of questions being encompassed by a single country, where responses given to the same country of destination were expected to be clustered.

3. Results

Table 1 shows the results of multi-level logistic regression. Results of fixed parameters are presented at the top of this table, and results for random parameters are presented at the bottom of it. As seen, the majority of attributes were statistically significantly ($\alpha < .05$) associated with the probability of a medical travel except the type of the medical need (heart valve vs. hip replacement), shorter waiting time (vs. fewer costs), the interaction of heart valve replacement and quality of care, income level 'below poverty line', income level 'low', education level 'vocational school', and sex (male vs. female).

3.1 Drivers of Medical Travel

Quality was the strongest predictor of choosing travel for medical care, followed by cost and waiting time. Specifically, the odds of medical travel were 3.93 times higher if the quality of the procedure was better, regardless of the procedure invasiveness. The effect of waiting lists and costs was dependent upon the urgency of the procedure. When individuals addressed situations including less invasive medical procedures (i.e., hip replacement), costs were as influential as waiting times. When the individuals were faced with a highly invasive procedure (i.e., heart valve replacement), medical travel was estimated to be 2.13 times more likely for shorter waiting times than for cost reductions.

Demographic factors played an important role as medical travel drivers. Firstly, perception of home country health system influenced choices regarding medical travel. Specifically, if waiting time were shorter at home, the odds of choosing medical travel were 0.75. Similarly, the odds ratio (OR) was 0.36 if quality was perceived to be better at home than abroad. If costs were perceived as higher at home, odds for choosing medical travel were 1.30. Secondly, lower education level was significantly associated with increased probability of choosing medical travel. Individuals

who had only completed secondary school (OR 1.73) were more likely to travel compared to those who completed a Master's degree or equivalent, though having a Bachelor degree or equivalent was associated with being less likely to choose travel (OR 0.44) using the same reference. Lastly, experience living abroad was an especially influential factor, as even short periods of time spent abroad (six months to 1 year) were associated with significantly increased likelihood of choosing the medical travel option (OR 3.57).

3.2 Geographical Effects on Medical Travel

Countries were ranked according to the probability that they were chosen as medical travel destinations (Table 2). Northern Europe (represented by the United Kingdom and Germany) and the United States arose as the most preferred choices. Southern Asia (represented by Thailand and Singapore) and the Middle East (represented by Qatar and Dubai) were less likely choices, and received lower perceived ratings of care, in line with previous findings [5]. As participants were not presented with all scenarios, the values in Table 2 reflect estimated percentages based on all responses, weighted by factors for each scenario in consideration of previous responses from individuals (see [16]). The values indicate the likelihood of choosing travel in a specific scenario after controlling for procedure, reason and the other socio-demographic variables, and not the total number of prospective medical travelers who would be willing to receive care in a given country.

Note: Odds ratios are omitted as the estimation method can yield results above 100% and below 0%.

For those who have travelled for care prior to completing the survey, though, South Asian countries were rated among the most popular destinations [1]. While stated preferences are typically considered reliable proxies, it is important to understand these as hypothetical preferences, noting

the possibility for social desirability or contextual factors influencing responses in the study versus real behaviors.

4. Discussion

This study demonstrated that quality, cost and waiting time are all influential factors in deciding whether to undergo a medical procedure abroad, which is in line with previous studies [8, 14]. Importantly, this study demonstrates that out of the three factors, quality of treatment plays the most critical role. Prospective medical travelers consider quality of received treatment as the utmost priority, however, there are currently no global regulations in place to ensure that receiving medical institutions adhere to adequate quality standards.

At present, medical travel represents a highly unregulated market with informational and legal ambiguities. The model presented suggests that lower educational attainment is strongly associated with greater willingness to obtain medical treatment abroad. This presents a challenge as particularly the less-educated medical travelers might not be fully aware of risks associated with obtaining medical treatment abroad. A global action should be taken to reduce these ambiguities, and prospective medical travelers should be better informed about the multi-stage process of medical travel, and how each stage is linked to specific responsibilities, risks and benefits. This may perhaps be considered as a large-scale nudge, as it would not remove the option of traveling for care, but simply reduce the likelihood of unnecessary risks from limited information about the choices available.

Taking this composite model as well as the additional work cited into account, we propose a policy framework to improve patient safety and access to quality care. This is particularly in the context of responding directly to standing calls from the OECD for evidence to inform such a framework. Each point represents a key component for a full policy platform that should be in

place to ensure best practice, including evaluation of impacts. The proposed policy framework is merely a starting point, not a regulatory benchmark. The aim is to provide guidance to policymakers in increasing access to care on a global level and controlling the rapidly rising costs of medical treatment. We propose these to include:

1. Binding quality standards as well as a mechanism for clear communication of such standards to all prospective patients. Standards should offer the ability to compare between locations of care and the home country. A universal standard is needed to establish relative differences. Any prospective host provider not meeting these standards should be transparent with that information for patients as well as third parties (e.g. insurers, health ministries).
2. A publicly available repository of critical information accessible to prospective medical travelers, which should include clear advice for safely receiving care abroad, across the domains presented. This tool should gather key insights on prospective travelers for continual policy adaptation and sophistication.
3. Secure, efficient, and standardized processes for sharing patient records between home and host providers should be mandatory. This should also consider the availability of information to patients. At present, several governmental initiatives exist to establish between-country agreements for medical travelers' data sharing and financial coverage of health expenses abroad, however, these efforts are often in an early stage of partnerships [22, 23]. Singapore is a notable exception in this area, with a governmental initiative that facilitates sharing of patient records between public and private institutions for both local and foreign patients [24]. Some of these points are likely to be covered in Europe, where

General Data Protection Regulation guidelines will assist in formal application of standards.

4. Economic and legal protections for patient groups, local health services, providers, and third-parties. Patients should be provided clear information on all related costs prior to choice and treatment. Hosting clinics must demonstrate what the effect of increased medical visitors will have on access and cost for locals. Providers should have fair warning of clear regulations regarding charges and liabilities linked to the timeline of care for each patient. Insurers and health ministries should have clear guidelines, limitations, and liabilities outlined in advance of any care received abroad.
5. Appropriate boundaries and safeguards that support reasonable autonomy in patient choice. Policies should clarify to what extent they are applicable if patients go off-piste with choice, particularly related to treatment in clinics not meeting standards, and what implications this has on liability.
6. Standard outcome measures that include indicators for recovery, all relevant timelines (i.e. waiting for treatment, treatment, admission length, inpatient rehabilitation, outpatient rehabilitation in country of care, and follow-up time after return to home country), cost comparisons, change in average costs in participating countries, and impact on clinical resources (i.e. doctors, nurses, administration) in participating locations.
7. Specific provisions for adaptation of policies by workplace insurance and other likely third-party actors.
8. Clear definitions of any regulatory adaptations necessary for care for travelling or visiting patients (as opposed to those applied to local patients).

9. An agreed ‘ultimate’ outcome measure in global health policy should be established. In line with the WHO approach linked to the Health in All Policies agenda [25], we propose this to be a comprehensive measure of patient mental, physical, and social well-being [17].

These recommendations are neither absolute nor universally robust, but present key features that appear regularly in studies on this subject as well as in our own findings. Some may seem rather obvious, but based on the clear lack of awareness related to some standards and practices, we make them explicit for the sake of cogence. We strongly encourage all features be subject to further rigorous study, particularly from those organizations that have highlighted the potential of medical travel for impact on global health.

4.1 Limitations

Naturally, this study and the wider body of work from which it stems are subject to a number of limitations, most of which have been outlined in prior publication. Other concerns that could be addressed for more robust insights in future study would be to account for health systems in home countries versus those being considered for receiving care, particularly on how payment for services is handled.

Critically, the nature of the sample and how they were initially engaged in the study raises understandable concerns about skew and bias. These relate specifically to access and entry points between different social media sites, as well as demographic distributions in the sample compared to European and North American populations. The technology to track access points is now widely available and would be helpful to monitor in future iterations. The sample was also highly educated and predominantly European, which may have a major influence on why lower education was a significant predictor of travel (less variability increasing impact of potential outliers, for example).

However, it may also be an indication of what people consider to be receiving care abroad. For instance, when it comes to assessing public services, particularly within the Schengen Area, it might be much harder to differentiate between countries than between continents. In these ways, conclusions presented may be considered speculative to a degree regarding how a broader population might choose. The basis for those changes (such as a more representative spread of incomes and access to private insurance) should certainly be controlled for in future adaptations of this study.

Other limitations that could be addressed include lack of reliable information about participant health status such that it can be more useful in understanding treatment choices, as well as using a more narrow definition of medical travelers given the general population has a low probability of engaging in the option. Finally, further iterations of the model could consider all possible interactions, but given the factorial nature of such a model, we propose only doing so with an exponentially larger and more balanced sample.

5. Conclusion

In its present state, medical travel is a loosely – at least globally – regulated market of millions of individuals that lacks quality control and cannot guarantee legal and economic safety. The present work has contributed to the existing body of research of medical travel by providing insights about the decision-making of prospective travelers. Relying on empirical data on medical travel, this study introduced an evidence-based policy framework, providing a starting ground for the development of global health access policy. Addressing the nine specific actions outlined in the framework can improve access and decrease costs of medical travel, while ensuring the safety of patients, hospitals, and third-party providers.

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ACCEPTED MANUSCRIPT

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Table 1.

Multilevel model results: Parameter and error estimation for fixed (top) and random parameters and model fit statistics (bottom).

Variable	Category	Coefficients (CI)
Fixed Parameters		
Individual level		
Intercept		4.71(1.82 – 12.17) **
Procedure	Heart valve replacement	1.00 (0.77 – 1.31)
Reason	Waiting List	0.99 (0.76 – 1.30)
	Quality	3.93 (2.91 – 5.33) **
Procedure x Reason	Heart valve replacement x Waiting list	2.13 (1.55 – 3.39) **
	Heart valve replacement x Quality	1.31 (0.85 – 2.02)
Income	Below Poverty	0.64 (0.34 – 1.18)
	Low	0.84 (0.61-1.16)
	Above Average	0.67 (0.47-0.95) *
	Very High	0.30 (0.14 – 0.63) **
Time Abroad	Between 6 months – 1 year	3.57 (2.56 - 4.98) **
	More than a year	7.18 (4.67 – 11.04) **
Rating of local healthcare	Waiting list	0.75 (0.63 – 0.90) *
	Cost	1.30 (1.10 – 1.54) *
	Quality	0.64 (0.53 – 0.78) **
Education	Secondary School	1.73(1.19 – 2.53) **
	Vocational School	1.25 (0.84 – 1.85)
	Bachelor Degree or eq.	0.44 (0.30 – 0.63) **
Previous medical travel	Experience in medical travel	0.61 (0.37 – 0.98) *
Sex	Male	0.82 (0.62 – 1.12)
Random Parameters		
Country of Destination Level		
Intercept – Country of Destination		1.99
Model Fit indexes		
ICC (intercept)		0.22
AIC		3336.84
BIC		3463.95

Note: ^aAll the results are presented as odd ratios with confidence intervals in parentheses * Significant at .05 level. ** Significant at .01 level. ICC = Intraclass Correlation Coefficient. AIC = Akaike Information Criterion. BIC = Bayesian Information Criterion. It is important to note that AIC and BIC are criteria for model comparison/selection but only one multilevel model was tested. These figures cannot be directly interpreted and have no meaning as stand-alone indexes but are presented in the event further analyses are done for contrast.

Table 2.

Estimated agreement to travel for medical care for each country.

Country	Estimated likelihood of travel
Germany	80.7%
United Kingdom	78.5%
United States of America	59.8%
New Zealand	58.0%
Australia	56.1%
Malta	50.3%
Portugal	50.0%
Dubai	46.4%
Qatar	38.3%
Singapore	35.7%
Philippines	22.3%
Thailand	21.6%